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(54) **METHOD AND APPARATUS FOR REDUCING NOISE FROM NEAR OCEAN SURFACE SOURCES**

(75) Inventor: **James B. Donald**, Pawcatuck, CT (US)

(73) Assignee: **The United States of America as represented by the Secretary of the Navy**, Washington, DC (US)

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(58) **Field of Search** 367/118, 119, 367/124, 125, 131, 135, 901

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Primary Examiner—Ian J. Lobo
(74) *Attorney, Agent, or Firm*—Michael J. McGowan; James M. Kasischke; Prithvi C. Lall

(57) **ABSTRACT**

The present invention is directed to a method and system for significantly reducing the acoustic noise from near-surface sources using an array processing technique that utilizes Multiple Signal Classification (MUSIC) beamforming and the Lloyd's Mirror interference pattern at very low frequencies. Noise from nearby near-surface sources, such as merchant ships, super tankers, fishing trawlers, seismic profiling platforms, or other sources near the ocean surface can significantly interfere with the detection and tracking of a quiet target-of-interest (TOI) located well below the ocean surface. The present invention reduces the noise of the near-surface sources without degrading the signal level and quality of the TOI. The present invention utilizes a unique application of the MUSIC beamforming process to separate the noise and signal subspace. Next, eigenvalue beamforming is used to reduce narrowband energy in selected frequency bins wherein the near-surface noise is radiating. Next, predetermined frequency and magnitude variance parameters are used to eliminate broadband noise emanating from the near-surface sources.

20 Claims, 3 Drawing Sheets